

## Entrepreneurial passion and a firm's innovation strategies

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## Entrepreneurial Passion and a Firm's Innovation Strategies

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*Drawing upon the role of affect in entrepreneurship model and the broaden-and-build theory of positive emotions, this study surveyed 195 entrepreneurs in Vietnam and found that entrepreneurial passion has a positive effect on a firm's exploratory innovation strategies and a complex inverted U-shaped effect on the exploitative innovation strategies. These results extend the literature on entrepreneurial emotions and underscore the need to depart from the simplistic linear association between entrepreneurial passion and firm-level indicators. Furthermore, this study enriches our understanding of three types of entrepreneurs' social identities by supporting their contingent effects on the links between passion and innovation strategies.*

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### Introduction

The extant entrepreneurship literature has found evidence for the impacts on firm-level strategies of various micro-level characteristics of entrepreneurs, such as risk aversion (Lewin, Long, and Carroll 1999), performance feedback (March 1991), and past experience (Sørensen and Stuart 2000). Researchers traditionally consider entrepreneurial decision-making to be a predominantly cognitive territory (Alvarez and Busenitz 2001). However, recently, research on emotions has emerged as a hot topic in entrepreneurship as researchers start to consider entrepreneurial emotions, such as passion, as a kind of resources (Baron 2008; Zahra and Newey 2009; Cardon, Foo, Shepherd, and Wiklund 2012). There have been numerous practical examples about the key role of entrepreneurial passion in firms' successful innovation.

When the founder of Virgin, Richard Branson, launched Virgin Money in 1995, he was particularly passionate about customer service. He aimed at instilling “passion for customer service into an industry that was known for a lack of it”, and passion has driven his firm's

strategies to innovate their services in the volatile banking industry, especially during the 2008-2009 financial crisis (Clarkson 2015). Similarly, when Steve Jobs returned to Apple, which was close to bankruptcy in 1997, he also confirmed with his staff that passion would be central to innovating the firm so that it could become one of the world's most valuable and innovative brands, as it is today (Gallo 2015). As entrepreneurial passion is increasingly considered to be crucial to truly innovating firms, it is important for entrepreneurs to understand how their passion drives firm-level operation or strategies, especially innovation strategies. A review of the extant entrepreneurship literature reveals several notable limitations.

First, despite the wide recognition that entrepreneurial passion is “one of the most frequently observed phenomena of the entrepreneurial process” (Chen, Yao, and Kotha 2009, p.199), there have been scant empirical investigations into its role (Murnieks, Mosakowski, and Cardon 2014; Drnovsek, Cardon, and Patel 2016). Entrepreneurial passion is defined as “a consciously accessible, intense positive feeling” (Cardon, Wincent, Singh, and Drnovsek 2009, p.515) that is “accompanied by cognitive and behavioral manifestations of high personal value” (Chen et al. 2009, p.199). The entrepreneurship literature has called for more studies on the impact of emotions, especially entrepreneurial passion, on a firm's strategies and performance (Cardon et al. 2012). Second, most previous studies focus on the simplistic linear impact of entrepreneurial passion on entrepreneurial performance such as persistence (Cardon and Kirk 2015), start-up decisions (Dalborg, von Friedrichs, and Wincent 2015), entrepreneurial self-efficacy (Biraglia and Kadile 2017), or radical innovation in small and medium-sized enterprises (Strese, Keller, Flatten, and Brettel 2018). Although the recent literature on emotions has highlighted the nonlinear, complex effects of positive emotions (Lam, Spreitzer, and Fritz 2014), the potential curvilinear impact of entrepreneurial passion on the firm's activities remains ignored. Third, innovation is considered to be the core of entrepreneurship, and the entrepreneurship literature has highlighted the importance of exploratory and

exploitative innovation strategies in driving strategic learning, profit and performance (Sirén, Kohtamäki, and Kuckertz 2012; Kollmann and Stöckmann 2014). However, there is little evidence for how entrepreneurial characteristics, especially entrepreneurial passion, influence the firm's innovation strategies. Finally, as “firm creation is an inherently social activity, and organizations are themselves social constructions” (Fauchart and Gruber 2011, p.935), the concept of social identity has started to be adopted in the entrepreneurship literature, and recent studies have suggested the important role of identity when conceptualizing entrepreneurial passion (Cardon et al. 2009; Murnieks et al. 2014). However, there is a notable lack of empirical research into the interaction effect of entrepreneurs' passion and their social identities on the firms' activities.

In dealing with the above limitations, this study is built upon the model of the role of affect in entrepreneurship (Baron 2008) and the broaden-and-build theory of positive emotions (Fredrickson 1998) to achieve three main research purposes. The first purpose of this research is to investigate the extent to which entrepreneurial passion (a micro-level entrepreneurial characteristic) affects the tendency of a firm to adopt exploitative or exploratory innovation strategies (a macro-level decision). Second, the study attempts to examine more appropriate functional forms to represent the relationships between entrepreneurial passion and those two innovation strategies. Finally, building on identity theory (Burke and Reitzes 1981), the study looks into the moderating effects of the entrepreneur's social identity on the relationships above.

This research provides three theoretical contributions to the entrepreneurship literature. First, it is among the first studies to explore the extent to which entrepreneurial passion influences firm-level innovation strategies. Second, it contributes to an emerging important line of literature on the role of entrepreneurial emotions in the entrepreneurial process (Cardon et al. 2012) and the entrepreneurial passion literature (Breugst, Domurath, Patzelt, and

Klaukien 2012) by examining double-sided effects of passion on firm-level innovation strategies. Third, this study makes an important contribution to the literature on entrepreneurs' social identities (Burke and Reitzes 1981; Sieger, Gruber, Fauchart, and Zellweger 2016) by being among the first to explore how entrepreneurs' social identities (darwinians, communitarians and missionaries) moderate the links between entrepreneurial passion and a firm's innovation strategies. In addition to the theoretical contributions, this study attempts to provide several managerial suggestions for entrepreneurs and stakeholders, especially investors. First, the study offers entrepreneurs and investors an implication about how entrepreneurial passion will lead to different choices of innovation strategies for their firms. It confirms how entrepreneurs' characteristics and behaviors play a crucial role in determining their firms' activities and performance. Second, this study also improves entrepreneurs' and stakeholders' understanding of the potential complex double-sided effect of entrepreneurial passion on innovation strategies. Third, it is also important for entrepreneurs and investors to understand how the social identity of an entrepreneur can differentially moderate the links between their passion and the firm's innovation strategies.

### ***Theoretical background and hypothesis development***

#### **The role of affect in entrepreneurship model and the broaden-and-build theory of positive emotions**

This study employs the role of affect in entrepreneurship model (Baron 2008) as the overarching theoretical framework, supported by the broaden-and-build theory of positive emotions (Fredrickson 2001), to examine how entrepreneurial passion influences a firm's innovation strategies. The role of affect in entrepreneurship model argues that entrepreneurial emotions are influential on various crucial aspects of entrepreneurial cognitions, including perception, judgement, decisions, memory, creativity, preference for heuristic thought, and ability to cope with stress, via two underlining mechanisms: mood-dependent retrieval effects

(Eich 1995) and affect-as-information (Schwarz 2011). Therefore, entrepreneurial emotions exert substantial impacts on a wide range of business outcomes in the entrepreneurial process, such as social network development and capability to respond effectively to the dynamic environment (Baron 2008; Smith and Lohrke 2008; Conway, Tugade, Catalino, and Fredrickson 2013). The role of affect in entrepreneurship model (Baron 2008) offers a useful framework for this study for two reasons. First, instead of discussing the effect of emotions in decision-making in general, the model specifically focuses on the entrepreneurship context, which fundamentally differs from other contexts, e.g., consumer decision-making (e.g., Shiv and Fedorikhin 1999) and large organizational settings (e.g., Ashkanasy, Härtel, and Zerbe 2000; Gooty, Connelly, Griffith, and Gupta 2010). Second, the role of affect in entrepreneurship model emphasizes the interaction effect in “an intimate and continuous manner” between entrepreneurial emotions and cognitions, indicating that “this interaction is visible even at basic levels of brain functioning” (Baron 2008, p.336). Therefore, this matches one of our research purposes in this study, which is to examine the effect on a firm’s innovation strategies of the interaction between an entrepreneur’s social identity as a traditional cognitive concept (Berzonsky 2011) and entrepreneurial passion.

The role of affect in entrepreneurship model supports the vital impact of entrepreneurial emotions on various dimensions of entrepreneurial cognitions and business outcomes (Baron 2008). However, it does not directly discuss the effect of entrepreneurial positive emotions, such as entrepreneurial passion, although emotional valence (i.e., positivity and negativity) is the most important dimension of emotions (Barrett 2006). Thus, in addition to our overarching theoretical framework, the role of affect in entrepreneurship model (Baron 2008), this study also takes advantage of the broaden-and-build theory of positive emotions (Fredrickson 1998). The broaden-and-build theory of positive emotions illustrates two interrelated effects of positive emotions: the broaden effect and the build effect (Conway et al. 2013). In contrast to

negative emotions, which lead to immediate and specific actions (e.g., escape when fear arises), the broaden effect of positive emotions enriches overall and nonspecific entrepreneurial resources. For instance, positive emotions enlarge the entrepreneurial attention scope and facilitate entrepreneurial cognitive flexibility (Baron and Tang 2011). The build effect of positive emotions is a consequence of their broaden effect. As the broaden effect on overall entrepreneurial resources accumulates over time, positive emotions, such as entrepreneurial passion, may gradually shape “patterns of decision-making and actions that reflect investment in intellectual, personal, and social domains” (Conway et al. 2013, p.22). This research conceptualizes entrepreneurial passion as an “intense positive feeling” (Cardon et al. 2009, p.515); therefore, our theoretical framework is grounded on the role of affect in entrepreneurship model (Baron 2008) and the broaden-and-build theory of positive emotions (Fredrickson 1998). In the next section, we argue that entrepreneurial passion has a substantial impact on entrepreneurs’ choice of innovation strategies for their firms.

### **Entrepreneurial passion and exploratory innovation strategies**

Consistent with the role of affect in entrepreneurship model (Baron 2008) as the overarching theoretical framework in this study, many previous studies have confirmed the instrumental role of entrepreneurial emotions as vital inputs in influencing entrepreneurs’ cognitions, behaviors and outcomes (Burke and Reitzes 1981; Cardon et al. 2012; Drnovsek et al. 2016). Among various entrepreneurial emotions, there has been an increasing interest in entrepreneurial passion; however, investigation into the effect of this emotion on firm performance is still in its infancy (Drnovsek et al. 2016). According to Cardon, Gregoire, Stevens, and Patel (2013), entrepreneurial passion includes three domains: passion for inventing, passion for founding and passion for developing. In this study, we focus only on the passion for developing, as it is associated with the growth of the venture after being established and it matches the research purpose to examine its effect on the innovation strategies of firms

after founding. Previous studies found that entrepreneurial passion has a significant impact, not only on entrepreneurs' behaviors but also on their firms and employees. Entrepreneurial passion performs as the mechanism mediating the link from entrepreneurial self-efficacy to entrepreneurial persistence (Cardon and Kirk 2015), positively increases venture capitalists' decision to invest (Chen et al. 2009) and can be transferred from entrepreneurs to employees to influence employees' commitment to their firms (Cardon 2008). However, according to previous research, entrepreneurial passion does not always bring about positive outcomes. [The diversity in passion among a team of entrepreneurs can create a negative effect on the venture's performance \(de Mol, Cardon, de Jong, Khapova, and Elfring 2019\)](#). Besides, while entrepreneurs' passion for inventing and developing can positively influence their employees' affective commitment, passion for founding decreases such commitment (Breugst et al. 2012). Such findings emphasize the need for research into the double-sided effects of entrepreneurial passion.

In this research, on the basis of the broaden-and-build theory of positive emotions (Fredrickson 1998), the authors argue that entrepreneurial passion could be one of the important drivers of exploratory and exploitative innovation strategies. Following He and Wong (2004), we defined exploratory innovation strategies as innovation strategies characterized by search, discovery, experimentation and risk-taking to enter new product-market domains. As entrepreneurial passion is a strong positive emotional state (Chen et al. 2009), it has an important influence on entrepreneurial behaviors (Cardon and Kirk 2015). According to the broaden-and-build theory of positive emotions (Fredrickson 1998), positive emotions "all share the ability to broaden people's momentary thought-action repertoires and build their enduring personal resources, ranging from physical and intellectual resources to social and psychological resources" (Fredrickson 2001, p.219). Entrepreneurs experiencing positive emotions are more likely to view negative and neutral events (for example, risk-related



elements) more positively (Kumar, Banerjee, Meena, and Ganguly 2016). In short, positive affect such as entrepreneurial passion may lead entrepreneurs to undertake risky exploratory activities because it raises their expectation and positively tones their perceptions (Jia, Cai, and Xu 2014). Entrepreneurial passion may also make entrepreneurs better at recognizing new business opportunities and more successful in exploring new products and markets (Lee, Florida, and Acs 2004). Moreover, passion is a kind of entrepreneurial resource (Zahra and Newey 2009), which makes entrepreneurs more focused, attentive, resilient to cope with the risks of exploratory activities (de Mol, Ho, and Pollack 2018) and more motivated to experiment with original designs (Strese et al. 2018). Consequently, entrepreneurial passion could strongly increase the likelihood that entrepreneurs pursue exploratory innovation strategies for their firms. We hypothesize that:

*Hypothesis 1. Entrepreneurial passion is positively related to the firm's exploratory innovation strategies.*

### **Entrepreneurial passion and exploitative innovation strategies**

The study defines exploitative innovation strategies as firm-level strategies to carry out innovation projects to improve existing product-market efficiency (He and Wong 2004). Compared to exploratory innovation strategies, exploitative innovation strategies generate more immediate and certain results because entrepreneurs place a heavy emphasis on refining the existing knowledge and procedures (Lavie, Stettner, and Tushman 2010). According to the role of affect in entrepreneurship model (Baron 2008), entrepreneurial passion as a high level of the positive emotional state plays an influential role in entrepreneurial decision-making processes. Entrepreneurial passion increases firm-level exploitative innovation strategies by coloring entrepreneurial cognitive processes, such as entrepreneurs' judgements and memory (Baron 2008). Entrepreneurial passion directly provides entrepreneurs with positive signals regarding the current state of their firms, i.e., there might be nothing wrong with the existing

procedures of doing business because they are feeling good about the firms. Consequently, entrepreneurial passion can be positively related to the likelihood that entrepreneurs engage in more exploitative innovation strategies, which focus on making a better use of the existing knowledge. In addition, researchers have found evidence that entrepreneurial passion increases entrepreneurs' beliefs in the meaningfulness of their existing work, and their persistence and commitment to firm activities (Cardon and Kirk 2015). Therefore, entrepreneurial passion will encourage further pursuance of exploitative innovation strategies to improve existing knowledge and products.

However, unlike exploratory innovation strategies, the effect of entrepreneurial passion on exploitative innovation strategies may not follow a simple linear trajectory. Possessing an excessive degree of passion leads entrepreneurs to be less likely to adopt exploitative innovation strategies for their firms. Entrepreneurs must make a trade-off decision on how they pursue each strategy with their limited amount of resources (Luss and Gupta 1975; March 1991). Firms must choose between exploiting the existing information for immediate returns (exploitative innovation strategies) and searching for new information to enhance their future returns (exploratory innovation strategies). The “choice between exploration and exploitation emphasizes the role of targets or aspiration levels in regulating allocations to search” (March 1991, p.72). Entrepreneurs tend to make a choice to engage in one of these two innovation strategies based on their perspective of the relative position between their passion and the potential outcomes that each innovation strategy can generate. Entrepreneurs may adopt exploitative innovation strategies, which concentrate on taking advantage of the existing knowledge, if they have a lower degree of entrepreneurial passion (“target”). However, an excessive level of entrepreneurial passion significantly raises an entrepreneur's expectation (Jia et al. 2014), which may not generally be met by the potential outcomes of exploitative innovation strategies. Therefore, the authors propose that being extremely passionate about

developing would inhibit entrepreneurs from adopting exploitative innovation strategies for their firms. We hypothesize that:

*Hypothesis 2. Entrepreneurial passion has an inverted U-shaped association with the firm's exploitative innovation strategies.*

### **The moderating roles of entrepreneurs' social identities**

As discussed above, the role of affect in entrepreneurship model (Baron 2008) provides a useful theoretical framework for this study. It not only suggests the significant effect of entrepreneurial emotions but also offers a more complete picture by emphasizing the intimate interaction effect between entrepreneurial emotions and cognitions on numerous outcomes in entrepreneurship.

Traditionally, from the social-cognitive perspective, "identity is conceptualized as a cognitive structure" and it "governs and regulates the social-cognitive strategies" (Berzonsky 2011, p.55). According to the identity theory (Burke and Reitzes 1981) and previous studies on role identities in entrepreneurship, entrepreneurs' role identities have a significant influence on their behaviors (Cardon et al. 2013; Drnovsek et al. 2016). From a theoretical standpoint, passion strongly concerns intensive positive feelings to pursue activities that "are central and meaningful to an individual's self-identity" (Cardon et al. 2013, p.2). Therefore, in the context of entrepreneurship, entrepreneurial passion is also considered to be intensive positive feelings stimulating entrepreneurs to pursue activities relevant to their identities. [The displays of passion and identity by an entrepreneur are found to interact to influence the contagion of passion to their employees \(Hubner, Baum, and Frese 2019\).](#) While the recent identity literature in entrepreneurship has highlighted not only an entrepreneur's self-identity but also their social identity (Fauchart and Gruber 2011; Sieger et al. 2016; Murnieks, McMullen, and Cardon

2019), there is little research into how an entrepreneur's social identity interacts with their passion to influence their firm's activities.

There are three types of entrepreneurs' social identity that have been classified in the literature: darwinians, communitarians and missionaries (Fauchart and Gruber 2011). Communitarians found their firms with the target to serve and support their social community, and missionaries' firms are founded to serve the entrepreneurs' political visions and as a change agent in society (Fauchart and Gruber 2011; Murnieks et al. 2019). Meanwhile, entrepreneurs with darwinian social identity have high interest in making profits and accumulating personal wealth when creating their firms (Sieger et al. 2016). Darwinians mainly focus on establishing strong and successful firms. With a strong motivation to make money, when they are too passionate about developing their firms, they will not limit themselves to refining existing products. They will focus on creating new knowledge and enhancing necessary capabilities for survival and long-term prosperity. Therefore, the association between entrepreneurial passion and exploratory innovation strategies will become more positive, while the association between entrepreneurial passion and exploitative innovation strategies will be negatively influenced when the entrepreneur's darwinian social identity increases. We hypothesize that:

*Hypothesis 3. Darwinian social identity (a) positively influences the association between entrepreneurial passion and the firm's exploratory innovation strategies and (b) negatively influences the association between entrepreneurial passion and the firm's exploitative innovation strategies.*

To communitarian entrepreneurs, their personal community serves as the primary frame of reference in the social space (Fauchart and Gruber 2011) and they only focus on innovating their products to solve the problems of their personal community. Such a limited scope of attention will discourage the entrepreneurs' creativity and create forms of "collective blindness" (Turner 1976). The close attachment of communitarians to the community hinders

them from adopting an objective view of the market and identifying more lucrative opportunities for diversification and growth (Penrose 1959; Fauchart and Gruber 2011). Thus, they will have less chance to explore radical ideas outside of their community. Furthermore, when communitarians lead their firms according to the expectation of their communities, they will be less willing to take risks. As a result of increasing communitarian social identity, the association between entrepreneurial passion and exploratory innovation strategies will be less positive.

Entrepreneurs with communitarian social identity establish their firms with the aim to support their social community. They find the meaning of their work from being able to provide their community with better products and services, and their community is the main source of reference when they set up their firms (Sieger et al. 2016). As entrepreneurs with communitarian social identity develop their innovation based on their reference to their community (Fauchart and Gruber 2011), and their sources of ideas for innovation are limited, passion for developing will mainly drive them to extend current knowledge and existing products. Furthermore, communitarians holding strong commitment to and identification with their community will have increasing beliefs in the meaningfulness of their existing work; thus, highly passionate communitarians will be more likely to adopt exploitative innovation strategies (Cardon and Kirk 2015). To a communitarian, the satisfaction from doing their jobs for the benefits of the community matches the positive feelings from their passion, which encourages them to further pursue their existing work with exploitative innovation strategies. In other words, communitarian social identity will further encourage the pursuance of exploitative innovation strategies by highly passionate entrepreneurs.

*Hypothesis 4. Communitarian social identity (a) negatively influences the association between entrepreneurial passion and the firm's exploratory innovation strategies, and (b) positively*

*influences the association between entrepreneurial passion and the firm's exploitative innovation strategies.*

Finally, missionary entrepreneurs have the pressure of behaving responsibly to make a better world, which may impede their creativity and increase their reluctance to take risks (Fauchart and Gruber 2011). Previous research has found that when a decision maker has to bear responsibility for others' outcomes as well as their own, responsibilities will increase their risk aversion (Pahlke, Strasser, and Vieider 2015). Thus, for firm development, a missionary entrepreneur with increasing passion for developing will be less likely to aim at exploratory innovation strategies. Moreover, since missionary entrepreneurs establish their firms to "pursue their political visions and advance particular causes" (Fauchart and Gruber 2011, p.944), such specifically defined purposes may limit their exploration of new fields, new products and new knowledge. Therefore, to a missionary entrepreneur, high entrepreneurial passion for developing will have a less positive impact on their firm's adoption of exploratory innovation strategies.

Entrepreneurs with missionary social identity set up their firms with the target to advance a particular cause and find the meaning of their work and their self-worth from being able to behave in a responsible manner to make a better world (Fauchart and Gruber 2011). The society at large acts as the primary source of reference in the social space for missionary entrepreneurs (Sieger et al. 2016). To develop their firms, highly passionate entrepreneurs with missionary social identity will be more likely to pursue exploitative innovation strategies because they want to improve the product and the knowledge which they believe is already advancing the society for a particular cause. Therefore, we have the following hypotheses:

*Hypothesis 5. Missionary social identity (a) negatively influences the association between entrepreneurial passion and the firm's exploratory innovation strategies, and (b) positively*

*influences the association between entrepreneurial passion and the firm's exploitative innovation strategies.*

## **Research methods**

### **Research context**

The study selected Vietnam as the research context to examine our theoretical model. As a transitional, fast developing economy, Vietnam offers an interesting empirical setting to investigate the integration between entrepreneurial passion and social identity and firm-level strategies. Over the past three decades, Vietnam has been among the world's most impressive emerging economy success stories with high economic growth rates and a relatively young market with the continuously growing purchasing power (OBG 2017). According to the 2016 Global Entrepreneurship Monitor report, Vietnam has an active entrepreneurial environment and strong entrepreneurial passion among young people with 56.8 percent of adults noticing the opportunities to start new businesses and 73.5 percent of surveyed adults perceiving becoming an entrepreneur as a desirable career choice (GEM 2016). Furthermore, Vietnamese entrepreneurs mostly adopt darwinian social identity as they start their own businesses mainly to increase their own wealth rather than to pursue social goals. It is also reported that entrepreneurial activities in Vietnam are mainly not innovative when their innovation indicator in 2015 ranked only 50<sup>th</sup> out of 60 surveyed countries (GEM 2016). These characteristics of entrepreneurship in the context of Vietnam raise the need for an investigation into the interaction between entrepreneurial passion, social identity and a firm's innovation strategies.

### **Data collection**

This study has the entrepreneur as the unit of analysis and followed Luu and Ngo (2019) to ensure data equivalence when conducting the survey in Vietnam. The survey respondents were either the founders and/or owners by participating in the firms' start-up process. The study collected responses from 195 entrepreneurs, for a response rate of 62.5 percent. The study

conducted independent samples t-tests and found no significant differences between participating and non-participating firms, which implies that nonresponse bias is not a significant concern in this study. The respondents had mean age of 37 years and mean industry experience of 11.3 years. The sample includes 142 male entrepreneurs (72.8 percent) and 53 female entrepreneurs (27.2 percent). When compared to the profiles of typical entrepreneurs in Vietnam, our sample was relatively similar in terms of gender and mean age. According to the Mastercard Index of Women Entrepreneurs 2018, women hold 25 percent of CEO or board-level positions of businesses in Vietnam while female entrepreneurs account for 27.2 percent of participants in our sample (Mastercard 2018). A report by Asia Pacific Foundation of Canada showed that in Vietnam, entrepreneurs in micro, small, and medium enterprises have the mean age of 35 years while respondents in our study have the mean age of 37 years (Asia Pacific Foundation of Canada 2017). These comparisons confirmed the representativeness of our sample.

Of the key informants, 46 percent were CEOs, while 54 percent had the title of general managers, and all of the respondents were owners and/or founders who could influence or make the final decision on their firms' innovation strategies. The mean age of the firms was 7 years, while the mean size was 20 full-time equivalent employees. Firms in the final sample operate in the manufacturing sector (66 firms), retailing and distribution sector (91 firms) and services sector (146 firms) with some firms operating in more than one sector. To assess common method bias, this study adopted the marker-variable technique (Lindell and Whitney 2001), using the extent to which entrepreneurs have felt irritated toward their work and their firms over the last 3 years as a marker variable ( $r_M = -0.007$ ,  $p=0.92$ ). After partialling out the effect of  $r_M$ , the mean change in correlations of all constructs ( $r_U - r_A$ ) was 0.02; thus, this study does not appear to suffer from common method bias.



## Measures and measurement validation

We measured all constructs in this study with multi-item 7-point Likert scales, unless otherwise indicated, based on existing tested scales from previous research. *Entrepreneurs' social identities*: The study adapted the measurement scales of three entrepreneurs' social identities (darwinians, communitarians and missionaries) from Sieger et al. (2016). The darwinians scale includes four items, the communitarians scale includes five items, and the missionaries scale includes five items. *Entrepreneurial passion*: We adopted the measurement scale of entrepreneurial passion for developing from Cardon et al. (2013). The scale includes three items. *Exploratory and exploitative innovation strategies*: To measure exploratory and exploitative innovation strategies and to ensure accordance with our definitions, we adapt items from the popular measures of He and Wong (2004). The scale for exploratory innovation strategies includes three items and the scale for exploitative innovation strategies includes three items. *Control variables*: We included firm age, firm size, and entrepreneurial self-efficacy as control variables. Firm age and firm size reflect the firms' resources to invest in innovation strategies (Cohen and Levin 1989). Meanwhile, an entrepreneur with more self-efficacy will be more likely to adopt innovation strategies for the firms (Bandura 2000). Entrepreneurial self-efficacy was measured by the entrepreneur's confidence in successfully commercializing an idea or new development (Zhao, Seibert, and Hills 2005). Furthermore, as the impact of entrepreneurial passion on a firm's innovation strategies can be influenced by environmental factors, we included the firm's sectors as control variables in the models.

We conducted confirmatory factors analysis (CFA) to thoroughly validate the measurement model. Table 1 includes t-statistics, loadings, average variances extracted (AVEs), composite reliabilities (CRs), and fit indices. The non-normed fit index (NNFI), comparative fit index (CFI), and incremental fit index (IFI) all exceed 0.90, which implies that the measurement

model has a good fit to the data ( $\chi^2 = 318.356$ , d.f.=200, RMSEA=0.055) (Gerbing and Anderson 1992).

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Insert Table 1 about here  
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The measurement model includes two item loadings of less than 0.70; however, CRs of all latent variables exceed 0.70 and all items were significant at the one-percent significance level, which indicates good reliability (Fornell and Larcker 1981). In addition, according to Table 1, all constructs have good results for convergent validity as their AVEs are greater than 0.50 (Fornell and Larcker 1981). In Table 2, we can see that square roots of all AVE values were greater than the off-diagonal correlations, so the discriminant validity of all constructs is confirmed (Fornell and Larcker 1981).

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Insert Table 2 about here  
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## ***Empirical results***

### **Results**

The study tests the hypotheses using ordinary least squares (OLS) based hierarchical regression and presents the results in Table 3. For analysis with exploratory innovation strategies as the dependent variable, when the study included control variables (firm age, firm size, entrepreneurial self-efficacy, and three sectors) in Model 1, only entrepreneurial self-efficacy had a significant coefficient ( $\beta = 0.183$ ,  $p < 0.001$ ). Adding the linear term of entrepreneurial passion to Model 2 increased the R-squared by 4 percent. The results show that entrepreneurial passion has a positive association ( $\beta = 0.214$ ,  $p < 0.01$ ) with exploratory innovation strategies, which confirms Hypothesis 1. Model 3 tested the moderating effects of entrepreneurs' social identities on the link between entrepreneurial passion and exploratory innovation strategies. The results support Hypothesis 5a by revealing the significant and

negative moderating effect of missionary social identity ( $\beta = -0.209, p < 0.01$ ) on the positive impact of entrepreneurial passion on exploratory innovation strategies. Hypotheses 3a and 4a are not supported, as the moderating effects of darwinian social identity ( $\beta = 0.066, p > 0.10$ ) and communitarian social identity ( $\beta = 0.027, p > 0.10$ ) are not significant.

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 Insert Table 3 about here  
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For analysis with exploitative innovation strategies as the dependent variable, among the control variables (firm age, firm size, entrepreneurial self-efficacy, and three sectors) in Model 4, only entrepreneurial self-efficacy ( $\beta = 0.162, p < 0.01$ ) and manufacturing sector ( $\beta = 0.336, p < 0.01$ ) were significant. Adding the linear term of entrepreneurial passion to Model 5 increased the R-squared by 9 percent and adding the quadratic term of entrepreneurial passion to Model 6 increased the R-squared by 3 percent. Both the linear term ( $\beta = 0.179, p < 0.10$ ) and quadratic terms ( $\beta = -0.155, p < 0.01$ ) of entrepreneurial passion have significant effects on exploitative innovation strategies, which confirms Hypothesis 2 for the inverted U-shaped impact of entrepreneurial passion on exploitative innovation strategies. The study tested the interaction effects between entrepreneurial passion, both linear and squared, and entrepreneurs' social identities in Model 7. The results support Hypotheses 3b and 4b by revealing the significant and negative moderating effect of darwinian social identity ( $\beta = -0.209, p < 0.01$ ) and the significant and positive moderating effect of communitarian social identity ( $\beta = 0.288, p < 0.001$ ) on the curvilinear effect of entrepreneurial passion on exploitative strategies. Hypothesis 5b is not supported, as the moderating effect of missionaries is not significant ( $\beta = -0.040, p > 0.10$ ). Table 4 summarizes the hypothesis testing results.

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## Robustness check

As a firm's innovation strategies can have an impact on the entrepreneurs' level of passion for their firms, our study examined the possibility of endogeneity in the models using two-stage least squares (2SLS) in Stata 15 with an instrumental variable for entrepreneurial passion. This instrumental variable should be correlated with the potentially endogenous independent variable, but should not be correlated with the error term (Wooldridge 2009). We used the entrepreneur's industry tenure as the instrumental variable for entrepreneurial passion because Li, Zhang, and Yang (2017) found the correlation between tenure and passion, while there is little evidence for the correlation between the entrepreneurs' industry tenure and firms' innovation strategies. We measured the entrepreneurs' industry tenure by the number of years the entrepreneurs have been working in the industry in which their firms operate. Using Stata 15's "ivendog" command for endogeneity tests, the study revealed no concern for endogeneity in the model with exploratory innovation strategies as the dependent variable (Durbin-Wu-Hausman chi-squared test:  $\chi^2=1.666$ ,  $p>0.10$ ; Wu-Hausman F-test:  $F[1,185] = 1.602$ ,  $p>0.10$ ) and in the model with exploitative innovation strategies as the dependent variable (Durbin-Wu-Hausman chi-squared test:  $\chi^2=0.592$ ,  $p>0.10$ ; Wu-Hausman F-test:  $F[2,183] = 0.280$ ,  $p>0.10$ ) (Wooldridge 2009).

Furthermore, the study tested for the alternative model by examining the possibility of the curvilinear effect of entrepreneurial passion on exploratory innovation strategies by including the squared term of entrepreneurial passion in Model 2. The results confirmed that there is no curvilinear effect of entrepreneurial passion on exploratory innovation strategies when the squared term of entrepreneurial passion does not have a significant coefficient ( $\beta = -0.018$ ,  $p>0.10$ ).

## ***Discussion***

### **Theoretical implications**

Building upon the role of affect in entrepreneurship model (Baron 2008) and the broaden-and-build theory of positive emotions (Fredrickson 1998), the current study extends the entrepreneurship literature by investigating how entrepreneurial passion influences two types of innovation strategies (Phelps 2010; Mueller, Rosenbusch, and Bausch 2013; Kollmann and Stöckmann 2014). The extant entrepreneurship literature has largely ignored the role of entrepreneurial emotions, such as entrepreneurial passion (Baron 2008). This study confirms the impacts of micro-level characteristics of entrepreneurs on firm-level activities (Cardon 2008; Chen et al. 2009). To our knowledge, this study is among the first to find that passion of an entrepreneur has significant and differential impacts on firm-level business strategies in the forms of exploratory and exploitative innovation strategies.

Second, this study contributes to an emerging line of literature emphasizing the use of appropriate functional forms to reveal actual relationships among phenomena of interest (e.g., De Langhe, Puntoni, and Larrick 2017). Our results also underscore the need to depart from the simplistic linear association between entrepreneurial passion and firm-level indicators. Figure 1 illustrates the positive association between entrepreneurial passion and exploratory innovation strategies, and the inverted U-shaped association between entrepreneurial passion and exploitative innovation strategies. This finding is consistent with previous studies which argue how positive feelings increase positive assessment of problems and negative events (Kumar et al. 2016). Strong positive emotions of entrepreneurs such as passion can motivate them to take risks or experiment with new designs (Jia et al. 2014) and to pursue exploratory innovation strategies for their firms. In addition, this study empirically confirms the “affect-as-information” theory (Clore, Gasper, Garvin, and Forgas 2001; Schwarz 2011), suggesting that the positive feelings associated with passion give entrepreneurs positive signals about their

firms and encourage the maintenance and improvement of their existing products. Furthermore, the study also reveals an interesting new finding that as entrepreneurs become too passionate about developing their firms, they will be less likely to pursue exploitative innovation strategies for their firms. Entrepreneurs' excessive passion will induce their high expectation of business outcomes (Jia et al. 2014). Therefore, they will be less likely to limit themselves to existing knowledge, markets or products and will reduce their exploitative innovation strategies.

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Insert Figure 1 about here  
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Third, contributing to the entrepreneurial passion and social identity literature, the empirical results enrich our understanding of the roles of entrepreneurs' social identities by supporting the contingent effects of three social identities on the links between entrepreneurial passion and innovation strategies. According to Figure 2a, darwinian social identity has a negative influence on the link between entrepreneurial passion and exploitative innovation strategies. With a strong motivation to establish successful firms for personal wealth, high entrepreneurial passion will drive darwinian entrepreneurs to reduce their emphasis on existing products or markets. Therefore, the association between passion and exploitative innovation strategies will become more negative. Meanwhile, the study also found that darwinian social identity does not significantly influence the association between entrepreneurial passion and exploratory innovation strategies. Highly passionate darwinian entrepreneurs are torn between the motivation to create new products to make more money (Sieger et al. 2016) and the reluctance to accept the risks of exploratory projects; therefore, darwinian social identity cannot make a significant impact on the link between passion and exploratory innovation strategies.

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Insert Figure 2 about here  
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On the other hand, Figure 2b illustrates the positive influence of communitarian social identity on the association between entrepreneurial passion and exploitative innovation strategies. Entrepreneurs with high communitarian social identity mainly lead their firms to solve the problems of their limited social community (Fauchart and Gruber 2011). Their excessive passion will be more likely to drive them to pursue strategies to improve or develop their existing products and markets only; therefore, the inverted U-shaped association between passion and exploitative innovation strategies will be positively influenced. The positive but nonsignificant influence of communitarian social identity on the link between passion and exploratory innovation strategies may originate from the fact that communitarian entrepreneurs are motivated to bring about radical solutions to the problems of their social community, but they suffer from “collective blindness” due to limited reference from their community, which hinders their abilities to generate exploratory ideas (Fauchart and Gruber 2011). Therefore, communitarian social identity does not have a significant influence on the link between passion and exploratory innovation strategies.

Finally, this study found a negative moderating impact of missionary social identity on the association between entrepreneurial passion and exploratory innovation strategies, as illustrated in Figure 2c. Compared to entrepreneurs with low missionary social identity, entrepreneurs with high missionary social identity more emphasize on social responsibilities when establishing their firms. It creates more pressure on entrepreneurs and makes them more reluctant to take risks (Pahlke et al. 2015). Therefore, entrepreneurial passion will be less likely to increase firm-level exploratory innovation strategies. On the other hand, missionary social identity has a negative but nonsignificant influence on the relationship between entrepreneurial passion and exploitative innovation strategies. Missionary entrepreneurs do not want to rely on existing knowledge to change the world, but they are also reluctant to take risks due to the social responsibilities (Alsos, Clausen, Hytti, and Solvoll 2016). As a result of such a dilemma,

the link between passion and exploitative innovation strategies does not significantly change when the entrepreneur's missionary social identity increases.

## **Managerial implications**

From the findings about the effects of entrepreneurial passion on innovation strategies and the moderation of entrepreneurs' social identities, our study offers a number of implications for entrepreneurs and investors. First, as professional investors think that entrepreneurial passion only matters to nonprofessional ones, they tend to place more focus on entrepreneurial preparedness than entrepreneurial passion in regard to fundraising (Harvard-Business-Review 2015). This research confirms that entrepreneurial passion is also an important factor to consider. Both professional investors and entrepreneurs should be aware that entrepreneurial passion is a significant catalyst driving their firms' choice of exploitative and exploratory innovation strategies. At different levels of passion for developing, entrepreneurs may choose either exploitative or exploratory, or both, innovation strategies for their firms. Second, our study suggests entrepreneurs and their firms' stakeholders should be aware that the influence of entrepreneurial passion for developing on innovation strategies does not always follow a simple, linear trajectory. When entrepreneurs have low to moderate passion for developing their firms, they will be more likely to pursue both exploitative and exploratory innovation strategies. However, when they are too passionate about developing their firms, they are likely to continue adopting exploratory innovation strategies, while reducing their reliance on exploitative strategies. Finally, the study provides stakeholders, especially investors, with an important implication that how entrepreneurs identify themselves as darwinians, communitarians or missionaries differentially moderates the links between their passion and their firm's innovation strategies. It is crucial to investors to predict innovation strategies of a firm before making their decisions on investments (Sapienza 1992). A firm's investors should be aware that to a darwinian entrepreneur with a strong motivation to gain personal wealth via



their firms, their passion for developing will be less likely to drive them to adopt exploitative innovation strategies for their firms. Meanwhile, when investors can see an excessive passion for developing in communitarian entrepreneurs who establish their firms with the aim to solve their personal community problems, the investors can expect that the firms will be more likely to pursue exploitative innovation strategies. Last, exploratory innovation strategies will be less likely to be seen in firms of highly passionate missionary entrepreneurs.

### ***Limitations and future research directions***

The study has some limitations which open pathways for future studies. Although our sample managed to include a variety of sectors to ensure generalizability for this study, the research context included only one country and culture. Further study should expand the sample to various countries to examine whether cultural factors influence the effect of entrepreneurial passion on firm-level activities. Along with cultural factors, environmental characteristics such as market competitiveness should also be included as control variables for the impact of entrepreneurial passion on a firm's innovation strategies. In addition, given the limited access to objective data in the context of a developing country, the study used the subjective measurements of two innovation strategies, which may have limited reliability. To mitigate this limitation, we suggest future research use objective measurements for innovation strategies.

Furthermore, this study focuses only on entrepreneurial passion for developing, while Cardon et al. (2013) categorize passion into three types: passion for founding, passion for developing and passion for inventing. Therefore, future studies should investigate how entrepreneurs' passion for founding and inventing will influence their choices of strategies for firms. Another interesting future research direction would be to expand the examination of passion to board members of start-ups and investigate how their passion influences their choice of strategies and the entrepreneur's passion. Finally, this study is interested in examining the

differing relationships between entrepreneurial passion and exploratory and exploitative innovation strategies; therefore, it did not explicitly test the coexistence (ambidexterity) of these two innovative strategies. The literature would benefit from a study explicitly looking into how entrepreneurial passion influences a firm's adoption of exploration–exploitation ambidexterity.

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**Table 1**  
**Measurement items**

	<i>Loading</i>	<i>t-statistic</i>
<b>Darwinians</b> (CR = 0.83, AVE = 0.55) (1-Strongly disagree, 7-Strongly agree) (Sieger et al. 2016)		
I create my firm in order to make money and become rich.	0.76	18.20
I create my firm in order to advance my career in the business world.	0.76	17.92
As a firm founder, it is very important to me to operate my firm on the basis of solid management practices.	0.75	14.69
As a firm founder, it is very important to me to have thoroughly analyzed the financial prospects of my firm.	0.69	11.35
<b>Communitarians</b> (CR = 0.90, AVE = 0.65) (1-Strongly disagree, 7-Strongly agree) (Sieger et al. 2016)		
I create my firm in order to solve a specific problem for a group of people that I strongly identify with (e.g., friends, colleagues, community).	0.84	32.84
I create my firm in order to play a proactive role in shaping the activities of a group of people that I strongly identify with.	0.85	32.80
As a firm founder, it is very important to me to provide a product/service that is useful to a group of people that I strongly identify with (e.g., friends, colleagues, community).	0.74	16.54
When managing my firm, it is very important to me to have a strong focus on a group of people that I strongly identify with (e.g., friends, colleagues, community).	0.82	26.58
When managing my firm, it is very important to me to support and advance a group of people that I strongly identify with.	0.78	19.67
<b>Missionaries</b> (CR = 0.89, AVE = 0.62) (1-Strongly disagree, 7-Strongly agree) (Sieger et al. 2016)		
I create my firm in order to play a proactive role in changing how the world operates.	0.77	22.26
As a firm founder, it is very important to me to be a highly responsible citizen of our world.	0.75	16.78
As a firm founder, it is very important to me to make the world a “better place” (e.g., by pursuing social justice, protecting the environment).	0.88	43.92
When managing my firm, it is very important to me to have a strong focus on what the firm is able to achieve for society-at-large.	0.77	18.54
When managing my firm, it is very important to me to convince others that private firms are indeed able to address the type of societal challenges that my firm addresses (e.g., social justice, environmental protection).	0.74	16.32
<b>Exploitative innovation strategies</b> (CR = 0.86, AVE = 0.68) (He and Wong 2004)		
How important are the following objectives to your firm for undertaking innovation projects in the last 3 years? (1 = Not important, 7 = Very important)		
Improve existing product quality	0.71	10.79
Reduce production cost	0.87	30.62

Improve yield or reduce material consumption	0.88	44.53
<b>Exploratory innovation strategies</b> (CR = 0.77, AVE = 0.54) (He and Wong 2004)		
How important are the following objectives to your firm for undertaking innovation projects in the last 3 years? (1 = Not important, 7 = Very important)		
Extend product range	0.77	17.32
Open up new markets	0.64	4.82
Enter new technology fields	0.78	17.56
<b>Entrepreneurial passion</b> (CR = 0.81, AVE = 0.59) (1-Strongly disagree, 7- Strongly agree) (Cardon et al. 2013)		
I really like finding the right people to market my product/service to.	0.76	13.88
Assembling the right people to work for my business is exciting.	0.83	30.62
Nurturing and growing my business is an important part of who I am	0.72	44.53
Fit statistics: $\chi^2 = 318.356$ ; d.f.=200; CMIN/df= 1.592; NNFI=0.907; CFI=0.926; IFI=0.929; RMSEA=0.055; GFI=0.878.		



**Table 2**  
**Means, standard deviations, square root of average variances extracted, and correlations**

	Mean	SD	DAR	COM	MIS	EPLOIT	EPLOR	EPASS	ESE
DAR	5.98	0.91	<b>0.74</b>						
COM	4.65	1.58	0.25	<b>0.81</b>					
MIS	5.14	1.27	0.30	0.45	<b>0.79</b>				
EPLOIT	4.11	0.72	0.28	0.11	0.24	<b>0.82</b>			
EPLOR	4.33	0.74	0.28	0.14	0.29	0.37	<b>0.73</b>		
EPASS	4.40	0.63	0.37	0.11	0.18	0.28	0.34	<b>0.77</b>	
ESE	4.11	0.83	0.17	0.16	0.24	0.18	0.24	0.36	N/A

Notes: DAR = Darwinians; COM = Communitarians; MIS = Missionaries; EPLOIT = Exploitative innovation strategies; EPLOR = Exploratory innovation strategies; EPASS = Entrepreneurial passion; ESE = Entrepreneurial self-efficacy. All correlations greater than 0.13 are significant ( $p < 0.10$ ); Numbers shown in the diagonal denote the square root of the average variances extracted (AVEs).

**Table 3**  
**Regression results**

	<b>DV = Exploratory innovation strategies</b>			<b>DV= Exploitative innovation strategies</b>			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
<i>Control effects</i>							
Firm age	-0.052 (-0.973)	-0.056 (-1.063)	-0.059 (-1.153)	0.032 (0.540)	0.026 (0.464)	0.034 (0.615)	0.043 (0.829)
Firm size	-0.013 (-0.241)	0.014 (0.272)	0.035 (0.684)	0.037 (0.641)	0.079 (1.422)	0.087 (1.585)	0.088 <sup>+</sup> (1.691)
ESE	0.183*** (3.575)	0.121* (2.234)	0.088 <sup>+</sup> (1.644)	0.162** (2.869)	0.064 (1.095)	0.072 (1.261)	0.049 (0.883)
Manufacturing	0.124 (1.069)	0.088 (0.773)	0.062 (0.558)	0.336** (2.624)	0.280* (2.277)	0.296* (2.447)	0.269* (2.367)
Services	0.135 (1.057)	0.136 (1.089)	0.185 (1.515)	-0.136 (-0.969)	-0.135 (-1.003)	-0.110 (-0.832)	-0.066 (-0.530)
Retailing	0.152 (1.416)	0.152 (1.449)	0.135 (1.314)	0.104 (0.883)	0.105 (0.929)	0.085 (0.765)	0.074 (0.710)
<i>Main effects</i>							
EPASS		0.214** (3.014)	0.145* (1.955)		0.339*** (4.449)	0.179 <sup>+</sup> (1.844)	0.146 (1.557)
EPASS <sup>2</sup>						-0.155** (-2.620)	-0.178* (-2.305)
<i>Moderating effects</i>							
DAR			0.173* (2.174)				0.261** (3.017)
COM			-0.047 (-0.684)				-0.184* (-2.122)
MIS			0.111 (1.517)				0.183* (2.091)
EPASS x DAR			0.066 (0.831)				-0.074 (-0.573)
EPASS x COM			0.027 (0.295)				0.265* (2.165)
EPASS x MIS			-0.209** (-2.639)				-0.127 (-1.051)
EPASS <sup>2</sup> x DAR							-0.209** (-2.974)
EPASS <sup>2</sup> x COM							0.288*** (3.477)
EPASS <sup>2</sup> x MIS							-0.040 (-0.594)
R <sup>2</sup>	0.081	0.124	0.213	0.106	0.192	0.221	0.369
F-value	2.747*	3.754**	3.743***	3.689**	6.307***	6.551***	6.044***

Notes: ESE = Entrepreneurial self-efficacy; EPASS = Entrepreneurial passion; DAR = Darwinians; COM = Communitarians; MIS = Missionaries. Unstandardized coefficients for mean-centered variables are reported. t-statistics are in parentheses. \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ ; +  $p < 0.10$

**Table 4****Summary of hypothesis testing results**

	<i><b>Relationships</b></i>	<i><b>Hypothesis</b></i>	<i><b>Result</b></i>
H1	Entrepreneurial passion → Exploratory innovation strategies	+	+** Supported
H2	Entrepreneurial passion → Exploitative innovation strategies	∩	∩** Supported
H3a	Darwinian social identity as a moderator for the link between Entrepreneurial passion → Exploratory innovation strategies	+	+ Not supported
H3b	Darwinian social identity as a moderator for the link between Entrepreneurial passion → Exploitative innovation strategies	-	- ** Supported
H4a	Communitarian social identity as a moderator for the link between Entrepreneurial passion → Exploratory innovation strategies	-	+ Not supported
H4b	Communitarian social identity as a moderator for the link between Entrepreneurial passion → Exploitative innovation strategies	+	+*** Supported
H5a	Missionary social identity as a moderator for the link between Entrepreneurial passion → Exploratory innovation strategies	-	- ** Supported
H5b	Missionary social identity as a moderator for the link between Entrepreneurial passion → Exploitative innovation strategies	+	- Not supported